



Cider Faults

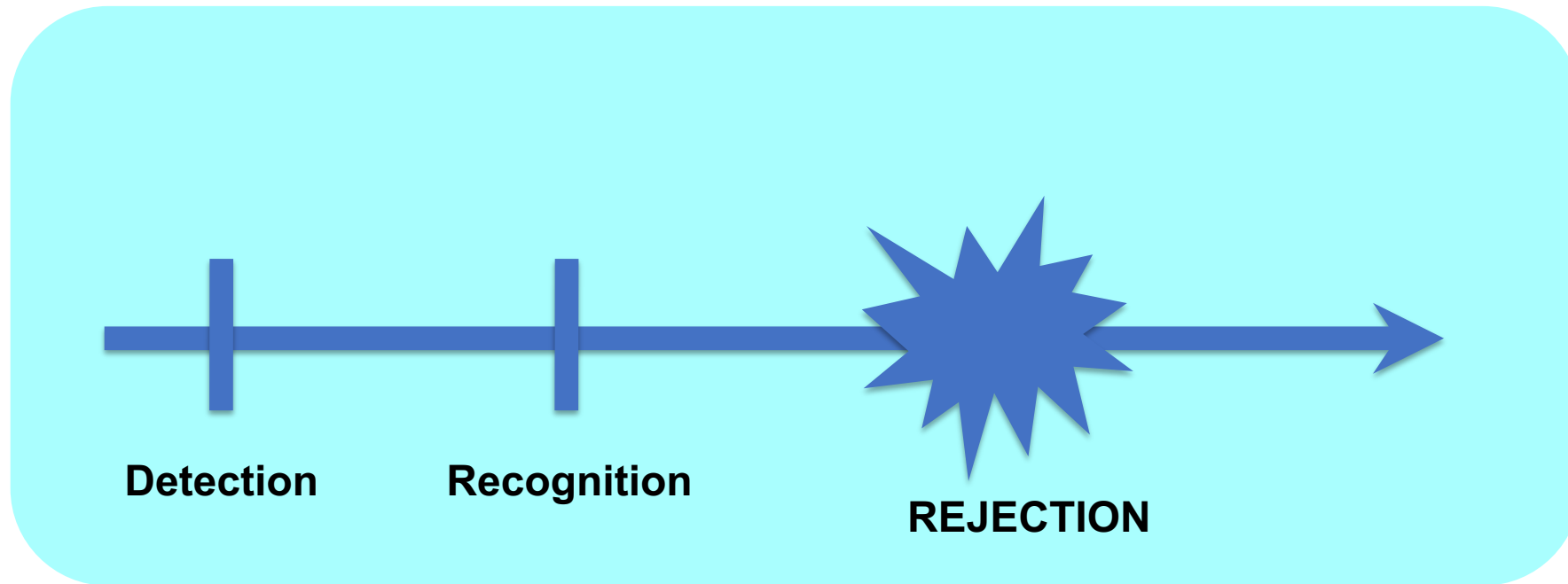
Identifying, understanding, preventing,
and mitigating common faults in cider

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Thresholds



Volatile Acidity

Acetic Acid & Ethyl acetate

- 5:1 ratio
- Threshold for acetic acid $\approx 7x$ higher than ethyl acetate

Aroma

- Low levels: fruity
- Higher levels:
 - Acetic acid = vinegar
 - Ethyl acetate = nail polish
- Wine type dictates dominant perception

Palate

- Enhanced acidity

Trigeminal

- Burning or prickling



Volatile Acidity: The Usual Suspects

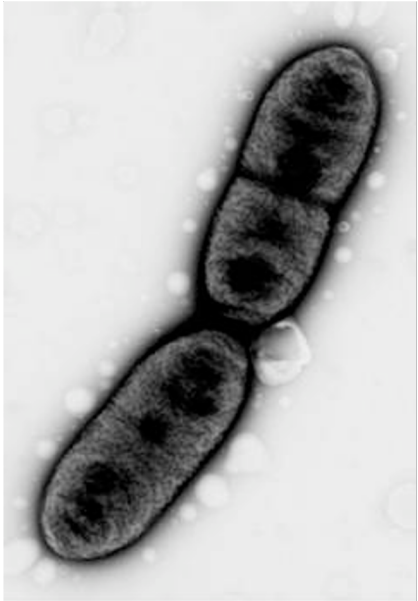


Photo: Heather Owen (UWM)



Image source: Vinquiry

Gluconobacter oxydans

Occurs naturally on fruit

Obligate aerobes

Acetobacter aceti

Ubiquitous

Obligate aerobes

Volatile Acidity: The Usual Suspects

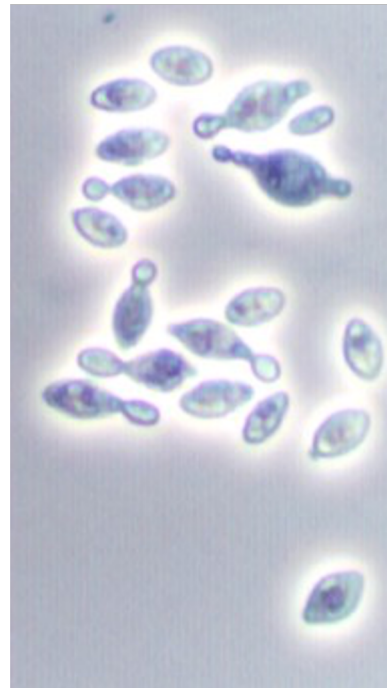
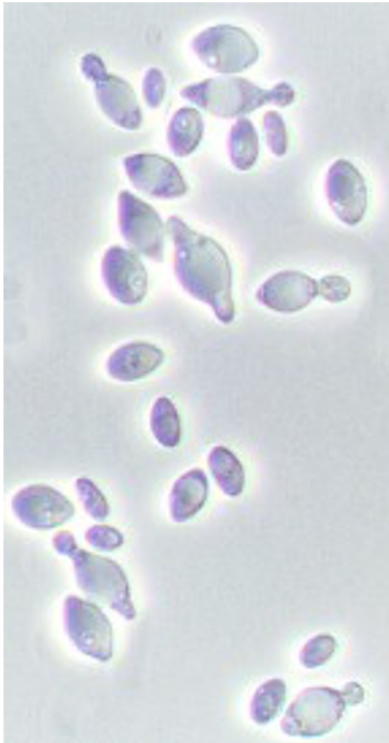


Image source: Vinquiry

- ***Kloeckera apiculata***
 - apiculate yeast
 - lemon shaped
 - predominant on fruit at harvest

Volatile Acidity: The Usual Suspects

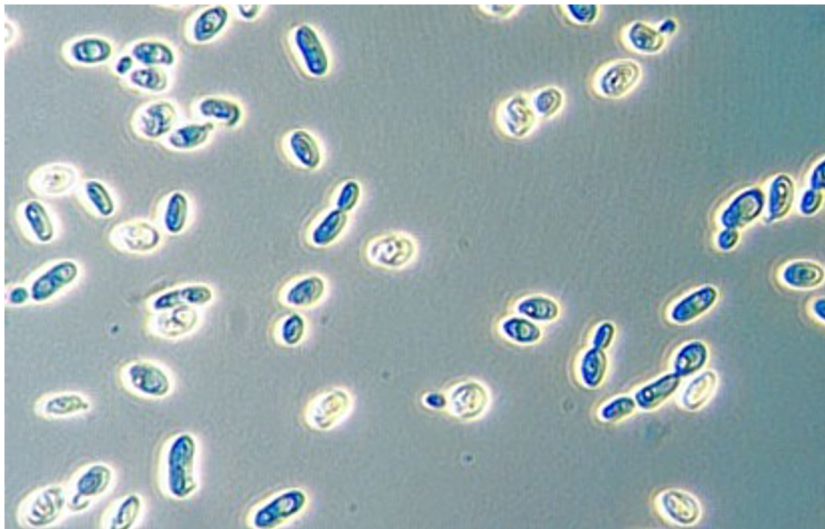


Image source: Vinqury

- ***Pichia membranefaciens***
 - Film yeast
 - Tolerates $\leq 11\%$ EtOH
 - Also produces isoamyl acetate

Volatile Acidity



Prevention

- Use clean fruit- no rot!
 - Ship fruit under refrigeration
- Cellar hygiene - no fruit flies
- Storage
 - Maintain free molecular SO₂ at 0.8 ppm
 - Appropriate temperature control
 - Keep containers full (no head space)
 - Use appropriate gas blanketing techniques

Correction

- Removal by reverse osmosis membrane + ion exchange (incomplete removal at best)

Acetic Acid

Aroma Description:

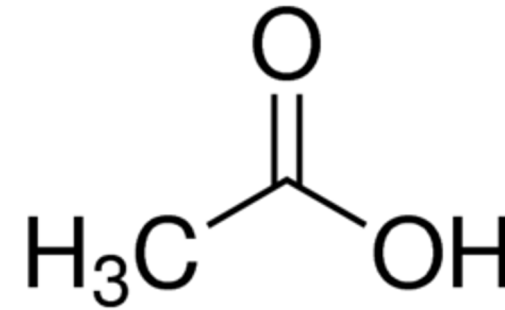
- Vinegar

Cause:

- Naturally produced by yeast
- Acetic acid bacteria contamination; oxygen

Prevention/Mitigation:

- Microbial control
- Limiting oxygen





Ethyl Acetate

Aroma Description:

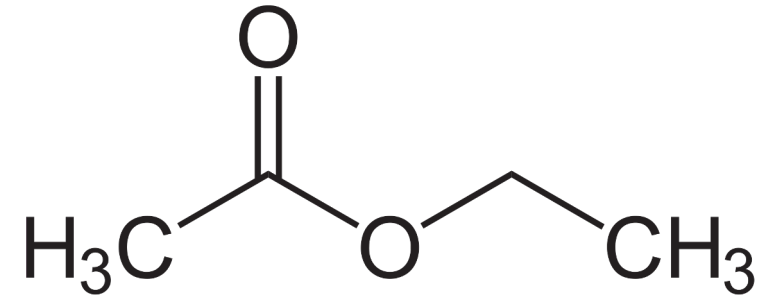
- Nail polish remover

Cause:

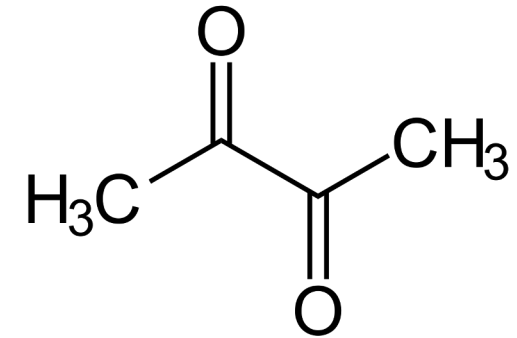
- Acetic acid bacteria
- *Hanseniaspora* wild yeasts

Prevention/Mitigation:

- Microbial control



Diacetyl



Aroma Description:

- Low concentrations: yeasty, nutty, toasty
- High concentrations: buttery, buttered popcorn

Cause:

- Microbial contamination
- Malolactic fermentation

Prevention/Mitigation:

- Cleaning/sanitation
- Preventing MLF





Acetaldehyde

Aroma:

- nutty, stale bread, rotten apple, sherry-like

Causes:

- Oxidation of ethanol or phenolics
- Yeast and bacteria, during and after fermentation

Prevention/ Mitigation:

- Minimize headspace post-fermentation
- Use inert gas
- Maintain proper SO₂ levels
- Fining

